

CLAIMS

- Sub. G1* →
1. A water treatment apparatus comprising a treatment housing (10, 60) having an inlet (18, 65) for the water to be treated, an outlet (25, 67) for the treated water, a heater (17, 76) within the housing to come into
5 direct contact with the water and a filter (22, 23, 78, 79) between the heater and the outlet, characterised in that means (38, 81) are provided to fill the housing with water up to a maximum level which leaves a headspace (10A, 80A) between the water and the roof (14, 61) of the housing, the entrance to the outlet being below the operating water level
10 (10B, 80).
 2. A water treatment apparatus according to Claim 1, characterised in that the housing (10, 60) is in the form of a disposable cartridge which may be dispensed with including its heater (17, 76).
 3. A water treatment apparatus according to Claim 1 or 2,
15 characterised in that the housing (10) contains one or more perforated screens (19, 20) between the heater (17) and the filter (22, 23).
 4. A water treatment apparatus according to Claim 3, characterised in that the housing (10) is cylindrical, the heater (17) is spaced above the base of the housing, the perforated screens (19, 20) are above the heater,
20 the filter (22, 23) is above the screens and the outlet (25) for treated water is above the filter.
 5. A water treatment apparatus according to Claim 3 or 4, characterised in that at least one perforated screen (19, 20) has depending legs (21) protruding downwardly from its underside.
 - 25 6. A water treatment apparatus according to any preceding claim, characterised in that the water to be treated first passes through a heat exchanger (11) where it is warmed before it passes to the housing.

7. A water treatment apparatus according to Claim 6, characterised in that treated water leaving the housing (10, 60) is passed through the heat exchanger (11, 66) to warm the incoming untreated water.
8. A water treatment apparatus according to Claim 6 or 7, characterised in that the heat exchanger (11, 66) and the water treatment housing (10, 60) are contained within a single unit.
9. A water treatment apparatus according to Claim 8, characterised in that the heat exchanger (66) is positioned directly below the water treatment housing (60).
10. A water treatment apparatus according to Claim 8, characterised in that the water treatment housing (10) and the heat exchanger (11) are housed side by side and one cover plate (14) closes the upper ends of both.
11. A water treatment apparatus according to Claim 10, characterised in that the cover plate (14) is a double-skinned plate formed by moulding in two parts which define internal galleries to provide the flow passages for the water.
12. A water treatment apparatus according to any preceding claim, characterised in that the heater (17, 76) has a wattage density of from 20 to 30 watts/cm².
13. A water treatment apparatus according to any preceding claim, characterised in that it includes means to vibrate the heater.
14. A water treatment apparatus according to any preceding claim, characterised in that it has a throughput of 12 to 18 litres of untreated water per hour into the housing (10, 60) and a heater (17, 76) of from 1000 to 1200 watts.

Sub. A, cont.

15. A water treatment apparatus according to any preceding claim, characterised in that a temperature probe is positioned in the housing (10, 60) to monitor the water temperature.
16. A water treatment apparatus according to any preceding claim,
5 characterised in that the means to fill the housing with water up to a maximum level comprises a water depth probe (38, 81).
17. A water treatment apparatus according to Claim 16, characterised in that two or more water depth probes (38, 39 40) are used to monitor water levels in the housing.
- 10 18. A water treatment apparatus according to Claim 15, 16 or 17, characterised in that the probes (38, 39, 40, 81) are fitted within a separate chamber within the housing, which chamber only receives heated treated water after it has passed through the filter (22, 23, 78, 79).
- 15 19. A water treatment apparatus according to any preceding claim, characterised in that one or more probes in the housing (10, 60) are used to measure water quality.
20. A water treatment apparatus according to any preceding claim, characterised in that the treated water is passed to a reservoir, the reservoir having an inlet and an outlet pipe, the entry to the outlet pipe
20 within the reservoir being remote from the exit end of the inlet pipe.
21. A water treatment apparatus according to Claim 20, characterised in that automatic control means are provided to stop water flow through the apparatus (10, 60) when the reservoir is full.
22. A water treatment apparatus according to Claim 21, characterised
25 in that the control means also control the heater (17, 76) to allow the heated water to be maintained at a lower temperature in standby mode when the water flow is stopped.

- Sub-G1*
23. A water treatment apparatus according to any preceding claim, characterised in that it is housed in a cabinet, the door of the cabinet being closed by a controlled bolt mechanism, the control means being programmed to release the bolt only when the water temperature in the housing (10, 60) has fallen to a predetermined level.
24. A water treatment apparatus according to any one of Claims 6 to 23, characterised in that it includes means to allow a proportion of the untreated water leaving the heat exchanger outlet (16) to be drawn off instead of passing to the treatment housing (10).
25. A water treatment apparatus according to any one of Claims 7 to 24, characterised in that the heated water leaving the housing (10) is passed through cooling means (29, 30), e.g. a coil and fan arrangement, before passing back into the heat exchanger (11).
26. A water treatment apparatus comprising a treatment housing (10) and a heat exchanger (11), the treatment housing (10) having an inlet (18) for the water to be treated, an outlet (25) for the treated water, a heater (17) within the housing and a filter (22, 23) between the heater (17) and the outlet (25), characterised in that the inlet (18) to the treatment housing receives water that has passed from a source of untreated water through the heat exchanger (11) and the outlet (25) from the treatment housing passes treated water back through the heat exchanger (11), and bypass valve means (110, 112, 114) are provided to close the heat exchanger (11) to incoming untreated water and to allow the incoming untreated water to flow directly into the treatment housing (10), whereby the hot treated water passing through the heat exchanger (11) sterilises the heat exchanger.

Sub. G1

27. A water treatment apparatus according to Claim 26, characterise in that the bypass valve means is a first valve (110) on the inlet pipe to the heat exchanger (11) which is open during normal operation to allow inflow of untreated water and a bypass valve (114) in a bypass pipe (112)
- 5 between the source of untreated water and the first valve (110), the bypass valve (114) being closed during normal operation and the first valve (110) being closed and the bypass valve (114) opened to sterilise the heat exchanger.
28. A water treatment apparatus according to Claim 26 or 27,
- 10 characterised in that the heater (17, 76) is in direct contact with the water in the housing.